Rural Climate Dialogues
State Convening Presentations

1. ANNA CLAUSSEN – INSTITUTE FOR AGRICULTURE AND TRADE POLICY
2. WILL SEUFFERT – MINNESOTA ENVIRONMENTAL QUALITY BOARD
3. PAUL MOSS – MINNESOTA POLLUTION CONTROL AGENCY
4. MARK SEELEY – UNIVERSITY OF MINNESOTA EXTENSION
5. BRENDA HOPPE – MINNESOTA DEPARTMENT OF HEALTH
6. KELLY ASCHE – CENTER FOR SMALL TOWNS
7. MICHELLE GRANSEE – MINNESOTA DEPARTMENT OF COMMERCE
8. LISSA PAWLISCH – CLEAN ENERGY RESOURCE TEAMS
9. PHILIP SCHAFFNER – MINNESOTA DEPARTMENT OF TRANSPORTATION
10. PHILIPP MUESSIG – MINNESOTA GREENSTEP CITIES
11. DAN SHAW – MINNESOTA BOARD OF WATER AND SOIL RESOURCES
12. BRAD REDLIN – MINNESOTA DEPARTMENT OF AGRICULTURE
A love of rural unites us
The Rural Population

- 15% of U.S. population lives in rural areas
- 75% of U.S. land area is rural
Rural Political Context

Rural people make up...

• Over 50% the population in 15 states

• Over 29% of the population in 35 states

Rural citizens and their legislators have significant political power, especially when votes are close.
Impacts of a Changing Climate

• Natural resource-based economies
• Energy costs
• Transportation challenges
We Have Solutions!

Community solutions identified through Rural Climate Dialogues
We Have a Voice!

50 organizations working nationally through the Rural Climate Network

www.ruralclimatenetwork.org

RURAL CLIMATE POLICY PRIORITIES
Solutions from the Ground
Climate Solutions and Economic Opportunities

Will Seuffert, Executive Director

Environmental Quality Board
Outline

• Why we care about climate in MN
• International Agreements
• Federal action
• State policy
• MN Clean Energy Economy
• Emissions trends and forecast
• What do we do next? State strategies for climate action
The Environmental Quality Board

- Governor’s office
- Five citizen members
- Board of Soil and Water Resources
- Department of Administration
- Department of Agriculture
- Department of Commerce
- Department of Employment and Economic Development
- Department of Health
- Department of Natural Resources
- Department of Transportation
- Metropolitan Council
- Pollution Control Agency
Cold temperatures warming fastest

Minnesota, Average Daily Minimum Temperatures
Winter (Dec - Feb) 1895-2014

Season Beginning
- Avg Min Temp
- 1901-2000 Avg: 0.6 F
- 7-yr moving avg
- 1895-2014 Trend: +0.45 F/decade
“Extreme heat, heavy downpours, and flooding will affect infrastructure, health, agriculture, forestry, transportation, air and water quality, and more. Climate change will also exacerbate a range of risks to the Great Lakes.”
Minnesota is already paying a price for climate change.

$4.3 Billion

*Estimated damages to property in Minnesota due to extreme weather between 2000 and 2012.*

Fig. 1-11. Flood damage along Whitewater River exceeded $4 million at Whitewater State Park.
Our school pledges to accelerate the transition to low-carbon energy while enhancing sustainable & resilient practices across our campus.
111D: Proposed Clean Power Plan Rule

**Goal:** Reduce carbon intensity of existing fossil fuel power plants in the U.S. by 32% by 2030 (below 2005 baseline)

- Trading encouraged across states
- Allows flexibility for compliance within the limits of permanent, verifiable, enforceable
Minnesota state policy

• Reduce energy use 1.5% a year through cost-effective efficiency measures

• 25% of states energy be derived from renewable energy resources by the year 2025
  • 1% solar mandate/10% goal

• Reduce statewide greenhouse gas emissions:
  • 15 percent by 2015
  • 30 percent by 2025
  • 80 percent by 2050
Emissions Inventory (2013)
Revised Electricity Sector Forecast
(CO2-e short tons)

- Business as usual (2013)
- Revised forecast (2015)
- Sherco reduction

IN MILLIONS

2012 2015 2020 2025 2030
Economic Growth with Climate Action

% Change GSP

% Change GHG

Total % Change (GHG/GSP)

1997 1999 2001 2003 2005 2007 2009 2011
Clean energy jobs have grown much faster than overall state employment.
What is next: Identify strategies to bend the curve

~50 million metric tons
How much is a million metric tons of CO2 equivalent?

or

91,241 homes' energy use for one year

or

210,526 passenger vehicles

or

2,325,581 barrels of oil consumed
<table>
<thead>
<tr>
<th>Immediate-impact policies</th>
<th>Long-term strategies to start now</th>
<th>Pilot programs to develop</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Electricity:</strong></td>
<td><strong>Urban development:</strong></td>
<td><strong>Transportation:</strong></td>
</tr>
<tr>
<td>• Increase the renewable</td>
<td>• Transit and multimodal travel</td>
<td>• Advanced biofuels</td>
</tr>
<tr>
<td>electricity standard</td>
<td>• Compact development</td>
<td>• Pay-as-you-go car insurance</td>
</tr>
<tr>
<td>• Retire and repower</td>
<td>• Electric vehicles</td>
<td>• Fuel- or carbon-based tax</td>
</tr>
<tr>
<td>coal plants</td>
<td>• Urban forests</td>
<td></td>
</tr>
<tr>
<td><strong>Energy efficiency</strong></td>
<td></td>
<td><strong>Energy:</strong></td>
</tr>
<tr>
<td><strong>opportunities:</strong></td>
<td></td>
<td>• Renewable thermal energy</td>
</tr>
<tr>
<td>• Conservation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>improvement programs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Combined heat and</td>
<td></td>
<td></td>
</tr>
<tr>
<td>power</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• SB 2030 building</td>
<td></td>
<td></td>
</tr>
<tr>
<td>guidelines</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Wastewater facilities</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Land management:</strong></td>
<td><strong>Agriculture:</strong></td>
</tr>
<tr>
<td></td>
<td>• Forest health</td>
<td>• Fertilizer efficiency</td>
</tr>
<tr>
<td></td>
<td>• Conservation and</td>
<td>• Market development for</td>
</tr>
<tr>
<td></td>
<td>working lands</td>
<td>cover crops and</td>
</tr>
<tr>
<td></td>
<td>• Agricultural soil development</td>
<td>perennials</td>
</tr>
</tbody>
</table>
Immediate Impact Policies
**Immediate Action** – These policies result in immediate reduction of greenhouse gas emissions. They account for 64 to 79% of the emissions reductions that could be made between now and 2030. All the immediate action policies focus on the electric sector.

<table>
<thead>
<tr>
<th>Policy options</th>
<th>2030 annual in-state GHG reduction (CO₂e-tons)</th>
<th>% Reduction towards 2030 target</th>
<th>NPV costs/savings 2015-2030 ($2014MM)</th>
<th>Average annual employment (full- and part-time)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase the renewable electricity standard to 50%</td>
<td>14</td>
<td>27</td>
<td>-404</td>
<td>1,820</td>
</tr>
<tr>
<td>Increase the renewable electricity standard to 40%</td>
<td>8</td>
<td>15</td>
<td>-620</td>
<td>1,510</td>
</tr>
<tr>
<td>Retire and repower coal plants</td>
<td>7</td>
<td>13</td>
<td>752</td>
<td>310</td>
</tr>
<tr>
<td>Increase energy efficiency requirements 2.5%</td>
<td>5</td>
<td>10</td>
<td>-1,882</td>
<td>1,560</td>
</tr>
<tr>
<td>Increase energy efficiency requirements 2%</td>
<td>4</td>
<td>7</td>
<td>1,272</td>
<td>N/A</td>
</tr>
<tr>
<td>Combined heat and power (CHP)</td>
<td>5</td>
<td>10</td>
<td>-1,112</td>
<td>2,330</td>
</tr>
<tr>
<td>Zero energy building codes (SB2030)</td>
<td>10</td>
<td>19</td>
<td>-2,050</td>
<td>2,750</td>
</tr>
<tr>
<td>Wastewater treatment facilities energy efficiency</td>
<td>0.07</td>
<td>0.14</td>
<td>-56</td>
<td>80</td>
</tr>
</tbody>
</table>
Minnesota Job Creation

![Bar chart showing average employment across different sectors.](chart)

- **SB2030**: Highest employment, significantly higher than other sectors.
- **CHP** and **50% RES**: Moderate employment levels.
- **2.5% CIP** and **40% RES**: Lower employment compared to other sectors.
- **Retire coal** and **Wastewater EE**: Lowest employment.
Long Term Strategies to Start Now
**Long-term Strategies** – These policies are critical for reaching Minnesota’s 2050 goals, but they require more time for development. Generally, these policies reduce the use of single-occupancy internal combustion vehicles and protect or increase carbon stores in soils and trees.

<table>
<thead>
<tr>
<th>Policy options</th>
<th>2030 annual in-state GHG reduction (CO$_2$-tons)</th>
<th>% Reduction towards 2030 target</th>
<th>NPV costs/savings 2015-2030 ($2014MM)</th>
<th>Average annual employment (full- and part-time)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transit and multimodal travel</td>
<td>0.28</td>
<td>1</td>
<td>-330</td>
<td>450</td>
</tr>
<tr>
<td>Compact development in urban areas</td>
<td>1</td>
<td>2</td>
<td>-425</td>
<td>220</td>
</tr>
<tr>
<td>Electric vehicles on 100% renewable energy</td>
<td>1</td>
<td>3</td>
<td>3,000 *</td>
<td>-1,220</td>
</tr>
<tr>
<td>Community and urban forests</td>
<td>1</td>
<td>1</td>
<td>1,806</td>
<td>4,180</td>
</tr>
<tr>
<td>Forest health</td>
<td>2</td>
<td>4</td>
<td>187</td>
<td>-210</td>
</tr>
<tr>
<td>Increased conversion of row crops to perennial crops</td>
<td>2</td>
<td>3</td>
<td>-2,104</td>
<td>-490</td>
</tr>
<tr>
<td>Increased use of cover crops</td>
<td>1</td>
<td>1</td>
<td>-1,346</td>
<td>230</td>
</tr>
<tr>
<td>Re-use, composting, and recycling</td>
<td>0.17</td>
<td>0.31</td>
<td>-817</td>
<td>2,750</td>
</tr>
<tr>
<td>Source reduction</td>
<td>0.06</td>
<td>0.12</td>
<td>-277</td>
<td>60</td>
</tr>
</tbody>
</table>

*assumes little change in the price of an electric vehicle
Pilot Projects to Develop
Pilot Project

- New technology
- New ideas
- Problem solving
- Experimental

Implement programs at a small scale

Public support positive outcome

Make program available to all Minnesotans

Problems & challenges

Re-evaluate, address problems, make changes
### Pilot Programs

These policies have high potential to reduce emissions; however, they involve new programs or technologies that need to be explored and tested before they can be implemented at a large scale. These policies include transportation options, distributed renewable energy for direct heating and cooling, and agriculture practices.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced and conventional biofuels</td>
<td>0.19</td>
<td>0.35</td>
<td>462</td>
<td>3,420</td>
</tr>
<tr>
<td>Transportation pricing cumulative</td>
<td>2</td>
<td>4</td>
<td>2,718</td>
<td>8,230</td>
</tr>
<tr>
<td>Transportation pricing: PAYD insurance component</td>
<td>1</td>
<td>2</td>
<td>-2,160</td>
<td>N/A</td>
</tr>
<tr>
<td>Transportation pricing: carbon tax component</td>
<td>1</td>
<td>1</td>
<td>1,898</td>
<td>N/A</td>
</tr>
<tr>
<td>Transportation pricing: fuel tax component</td>
<td>0.46</td>
<td>1</td>
<td>2,980</td>
<td>N/A</td>
</tr>
<tr>
<td>Thermal renewable energy</td>
<td>3</td>
<td>6</td>
<td>872</td>
<td>-690</td>
</tr>
<tr>
<td>Nutrient management in agriculture</td>
<td>0.15</td>
<td>0.29</td>
<td>-131</td>
<td>-200</td>
</tr>
</tbody>
</table>
Going Forward...

• How do we value and account for co-benefits and cross-sector outcomes?
• How do we partner with local governments to maximize the reach of our policies and tailor them to communities?
• How do we partner with the private sector to support partnerships that can maximize mitigation benefits?
• How do we best align strategies?
• How can we hold ourselves accountable?
Interagency Climate Adaptation Team: Role of Adaptation

Rural Climate Dialogues State Convening
September 9, 2016

Paul Moss, Minnesota Pollution Control Agency
Overview of presentation

- What is climate adaptation?
- What is the Interagency Climate Adaptation Team?
- What is connection to rural communities?
Adaptation/Mitigation

**Adaptation:**
- Addressing current & future climate impacts
- Risk management and infrastructure protection
- Local responses

**Mitigation:**
- Achieving greenhouse gas emissions reductions
- Energy and economic systems
- Global responses
What does adaptation look like?

Adaptation options can be thought about in two general categories (not mutually exclusive, and both have their roles and importance):

- **Single focus** efforts
- **Multiple benefit** approaches
### Adaptation options

<table>
<thead>
<tr>
<th>Examples</th>
<th>Single focus</th>
<th>Multiple benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Air conditioning</td>
<td>• Urban trees</td>
</tr>
<tr>
<td></td>
<td>• Larger culverts</td>
<td>• Stormwater best management practices</td>
</tr>
<tr>
<td></td>
<td>• Reinforced buildings</td>
<td>• Water conservation</td>
</tr>
<tr>
<td></td>
<td>• Community relocation</td>
<td>• Green building practices</td>
</tr>
<tr>
<td></td>
<td>• Back-up generators</td>
<td>• Home insulation</td>
</tr>
<tr>
<td></td>
<td>• More irrigation</td>
<td>• Distributed, renewable energy</td>
</tr>
<tr>
<td></td>
<td>• Deeper water wells</td>
<td>• Wetland restoration</td>
</tr>
<tr>
<td></td>
<td>• Flood walls</td>
<td>• Engaged communities</td>
</tr>
<tr>
<td></td>
<td>• Weather radios</td>
<td></td>
</tr>
</tbody>
</table>

- **Examples**
- **Single focus**
- **Multiple benefit**
Interagency Climate Adaptation Team

- Agency-based approach
- No mandate from Governor’s Office or Legislature
- Interagency Climate Adaptation Team (ICAT) started in 2009, initiated and coordinated by MN Pollution Control Agency in collaboration with EQB
- Includes core group of about a dozen agencies (Agriculture, Commerce, DEED, EQB, Health, Military Affairs, Natural Resources, Pollution Control, Public Safety, Transportation, Water & Soil Resources, Metropolitan Council)
ICAT’s vision is of a resilient, economically thriving, and healthy Minnesota that is prepared for both short- and long-term climate changes and weather extremes.
Key ICAT activities

- 2010 and 2013 ICAT reports
- Presentations: Legislature and EQB
- Agency collaboration: joint proposals, identification of opportunities
- Information sharing and updates of efforts within agencies
2013 ICAT Report

* Describes climate trends and impacts affecting MN
* Summarizes activities by agencies
* Opportunities for interagency action
Opportunity Areas (ICAT Report)

1. Building resilience to extreme precipitation
2. Implementing best practices that achieve multiple benefits
3. Protecting human health
4. Strengthening existing ecosystems by addressing ongoing challenges and risks
5. Building partnerships with local governments
6. Quantifying climate impacts
7. Conducting public and community outreach, education, and training
Assessing progress in Minnesota

- Initial adaptation work is ongoing at a number of agencies
- But – how is this helping to achieve overall statewide climate adaptation progress?
- ICAT has developed statewide indicators
- Anticipating release in 2017 ICAT report
Climate Adaptation Planning by Public Entities

Purpose of indicator:
• measure degree to which stand-alone adaptation plans are being prepared by agencies, local units of government and tribes
• Also measure degree to which adaptation is being incorporated into ongoing plans and planning

Data collection strategy:  Online survey
Lead Agency:  Pollution Control
Disruptions to the Power Grid

**Purpose of indicator:**
- Proxy measure of preparedness/resilience for extreme weather and other climate impacts

**Data collection strategy:**
- Utilize existing data sources

**Lead Agency:** Commerce
Purpose of indicator:
• Proxy measure of preparedness/resilience for extreme heat on human health

Data collection strategy:
• Utilize existing data sources

Lead Agency: Health
Purpose of indicator:
- Proxy measure of preparedness/resilience for climate impacts

Data collection strategy:
- Utilize existing data sources

Purpose of indicator:
• Proxy measure of implementation of green infrastructure practices for climate adaptation and degree of vulnerability to climate change

Data collection strategy:
• Utilize existing data sources

Lead Agency: Natural Resources
Adaptation needs to occur at the local level
Customized responses depending on local priorities and resources
Community involvement is key
- Energy
- Infrastructure
- Land Use, Management, and Stewardship

Why relevant to rural communities?
Opportunity areas for collaboration between state and rural communities

- Financial assistance from agencies: grants, loans
- Technical assistance
- Collaborative pilot projects
- Public outreach and education
- Vulnerability assessments and adaptation planning
- Identification and assistance to at-risk populations
- Data collection, monitoring, and research projects
- Development of case studies
Paul Moss
MPCA Climate Adaptation Coordinator
paul.moss@state.mn.us
(651) 757-2586
Greater Minnesota’s Extreme Weather and Climate Conditions: Evidence

Dr. Mark Seeley
Department of Soil, Water, and Climate
University of Minnesota
St Paul, MN 55108

For Rural Climate Dialogue/State Convening

St Paul, MN
September 9, 2016
RECENT SIGNIFICANT CLIMATE TRENDS IN MINNESOTA AND THE WESTERN GREAT LAKES

• **TEMPERATURE**: WARM WINTERS AND HIGHER MINIMUM TEMPERATURES

• **MOISTURE**: GREATER PRECIPITATION; HIGHER VARIABILITY; AND GREATER CONTRIBUTION FROM THUNDERSTORMS

• **DEWPOINTS**: GREATER FREQUENCY OF TROPICAL-LIKE ATMOSPHERIC WATER VAPOR
Temp trend is upward and more frequently above the 90th percentile, pace is 2°F per century.
Seasonal Statewide Temperature Trends in MN

Winter

Spring

Summer

Fall

Minnesota, Average Temperature, March-May

Minnesota, Average Temperature, June-August

Minnesota, Average Temperature, September-November
Trends in mean monthly temperatures at Winona, MN  
1971-2000 normals vs 1981-2010 normals (F)

<table>
<thead>
<tr>
<th>Month</th>
<th>Min Change</th>
<th>Max Change</th>
<th>Mean Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>+4.8</td>
<td>+2.2</td>
<td>+3.5</td>
</tr>
<tr>
<td>February</td>
<td>+3.3</td>
<td>+0.8</td>
<td>+2.0</td>
</tr>
<tr>
<td>March</td>
<td>+2.1</td>
<td>+0.7</td>
<td>+1.9</td>
</tr>
<tr>
<td>April</td>
<td>+2.5</td>
<td>+1.5</td>
<td>+2.0</td>
</tr>
<tr>
<td>May</td>
<td>+1.7</td>
<td>NC</td>
<td>+0.8</td>
</tr>
<tr>
<td>June</td>
<td>+1.8</td>
<td>+0.2</td>
<td>+1.0</td>
</tr>
<tr>
<td>July</td>
<td>+1.8</td>
<td>+0.1</td>
<td>+0.9</td>
</tr>
<tr>
<td>August</td>
<td>+2.2</td>
<td>+0.3</td>
<td>+1.2</td>
</tr>
<tr>
<td>September</td>
<td>+2.9</td>
<td>+0.6</td>
<td>+1.7</td>
</tr>
<tr>
<td>October</td>
<td>+2.2</td>
<td>-0.1</td>
<td>-1.0</td>
</tr>
<tr>
<td>November</td>
<td>+2.3</td>
<td>+0.4</td>
<td>+1.3</td>
</tr>
<tr>
<td>December</td>
<td>+3.4</td>
<td>+1.4</td>
<td>+2.4</td>
</tr>
</tbody>
</table>
Frequency of temperatures -30°F or colder at Pokegama Dam, MN

1887-1950 average 9 nights per year
1951-2014 average 2 nights per year

Frequency of temperatures -30°F or colder at Grand Rapids, MN

1915-1950 average 5 nights per year
1951-2014 average 3 nights per year
Frequency of temperatures -25 degrees F and colder at Morris, MN

1885-1940 average 4 nights per year
Since 1940 average 2 nights per year
Since 1980 14 years have brought no readings of -25 F or colder
Trend in annual precipitation for MN
## Change in Annual Precipitation Normal at Grand Rapids, MN

<table>
<thead>
<tr>
<th>PERIOD</th>
<th>AMOUNT (IN.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1921-1950</td>
<td>23.75”</td>
</tr>
<tr>
<td>1931-1960</td>
<td>25.57”</td>
</tr>
<tr>
<td>1941-1970</td>
<td>26.56”</td>
</tr>
<tr>
<td>1951-1980</td>
<td>26.36”</td>
</tr>
<tr>
<td>1961-1990</td>
<td>27.54”</td>
</tr>
<tr>
<td>1971-2000</td>
<td>28.78”</td>
</tr>
<tr>
<td>1981-2010</td>
<td>28.93”</td>
</tr>
</tbody>
</table>

22 percent increase since 1921-1950

*Extremes 14.62” in 1929, 38.00” in 1977*
Increase in heavy rainfall by region

Source: National Climate Assessment, National Climatic Data Center
Historical recurrence interval of 2 inch rains in southern MN was calculated to be once per year, and in western and northern MN once very two years. This is no longer the case.

Observed 2 inch rainfalls for the period 1991 – 2016 and maximum single day value for various communities:

<table>
<thead>
<tr>
<th>Location</th>
<th>No. 2 in. rains</th>
<th>Maximum Value (date)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Albert Lea</td>
<td>49</td>
<td>7.50 (6/15/1978)</td>
</tr>
<tr>
<td>Waseca</td>
<td>54</td>
<td>5.63 (9/23/2010)</td>
</tr>
<tr>
<td>Winona</td>
<td>40</td>
<td>5.10 (8/19/2007)</td>
</tr>
<tr>
<td>Morris</td>
<td>21</td>
<td>6.90 (4/26/1954)</td>
</tr>
<tr>
<td>Glenwood</td>
<td>26</td>
<td>5.41 (7/10/2002)</td>
</tr>
<tr>
<td>Grand Rapids</td>
<td>22</td>
<td>4.78 (6/19/2012)</td>
</tr>
<tr>
<td>Brainerd</td>
<td>33</td>
<td>4.76 (7/8/2002)</td>
</tr>
</tbody>
</table>
June 2014
Wettest month in history on a statewide basis

Hawley 10.95”
International Falls 10.24”
Kabetogama 11.93”
Granite Falls 10.99”
Belle Plaine 15.16”
Glencoe 14.61”
MSP 11.36”
Luverne 13.84”
Redwood Falls 14.24”
Waseca 12.93”
Rushford 12.76”
Observations – Minnesota Trends

Minnesota Mega-rain Events

August 6, 1866, Southern Minnesota
July 17-19 1867, Central Minnesota
July 20-22, 1909, Northern Minnesota
September 9-10, 1947 Iron Range
July 21-22, 1972, Grand Daddy Flash Flood
June 28-29, 1975, Northwest Minnesota
July 23-24, 1987, Twin Cities Superstorm
June 9-10, 2002, Northern Minnesota
September 14-15, 2004 Southern Minnesota
August 18-20, 2007, Southern Minnesota
September 22-23, 2010 Southern Minnesota
June 19-20, 2012, Northeast Minnesota
July 11-12, 2016 central and east-central Minnesota
August 10-11, 2016 west-central and southeastern Minnesota

*Defined as 6” or greater rains cover at least 1000 square miles and a peak amount of 8” or greater
Shift in Precipitation Recurrence Intervals

Mega Rains since 2002

Rainfall Totals - June 9 and 10, 2002

Precipitation Total July 11-12 2016

August 18 through August 20 (8:00 AM CDT), 2007

Total Rainfall June 19-20, 2012

Precipitation Total August 10-11 2016

September 22-23, 2010

‘1000-yr (approx.) events’ in Southern Minnesota in the last decade.
September 14-15, 2004

‘by-eye’ estimate of the total area covered by 10" of rain over the 7 years of 2004-2010 appears to be near 1400 sq. mi, or about 200 sq. mi per year. Given that the area of the southern 3 layers of counties looks to be approximately 6000 sq. mi, the areal fraction of the southern three counties covered by 10" per year appears to be approximately 1/100; i.e. at the rate of coverage for the last 7 years an area equal to the whole southern three county area could be covered in about 100 years.
Dewpoint Temperatures
Greater than or equal to 80 degrees F
Since 1996

Readings have been statewide with highest frequencies in central and southern counties.
Historical Minnesota Heat Waves:
Red denotes dewpoint driven
(pattern is episodic but increasing in frequency)
July 19-20, 2011

Heat Wave

Heat Index:
102°F Grand Rapids
114°F Mankato
114°F New Ulm
114°F Waseca
114°F Winona
118°F Red Wing
111°F Morris
114°F St James
114°F Fairmount
121°F Austin
134°F Moorhead
For those who doubt or wish to dismiss the evidence that climate is changing,…the data indicate it is happening with respect to the central measures of climate (averages), but more consequentially with respect to the frequency of extremes. It is clearly poor judgment to ignore this!

Share your views on this issue and role model stewardship in your family, community and workplace

www.cloudappreciationsociety.org
Minnesota Rural Health and Climate Change

Rural Climate Dialogues State Convening
September 9, 2016

MDH Minnesota Department of Health
MN Climate and Health Program
MN Climate and Health Program

Building Resilience Against Climate Effects

01 Projecting the Disease Burden
02 Assessing Public Health Interventions
03 Developing and Implementing a Climate and Health Adaptation Plan
04 Evaluating Impact and Improving Quality of Activities
05 Forecasting Climate Impacts and Assessing Vulnerabilities

Social Determinants of Health

Social, Economic & Political Factors
Living & Working Conditions
Public Services & Infrastructure
Individual Behaviors
Individual Factors

MDH
MN Climate and Health Program

Changes in our atmosphere lead to health effects:

- **Rise in atmospheric greenhouse gases**
  - **Rise in temperature**
  - Changes in precipitation

- **Air pollution**
  - Direct effects: 
    - Initiate or worsen respiratory, cardiovascular and other diseases
  - Indirect effects:
    - Reduced visibility
    - Reduced productivity at work or school
    - Degradation of crops and water bodies

- **Extreme heat**
  - Direct effects:
    - Heat stress and illness
    - Worsening of pre-existing conditions
    - Heat-related mortality
  - Indirect effects:
    - Infrastructure failures
    - Strain on essential services
    - Disruption to key social networks

- **Floods & drought**
  - Direct effects:
    - Mental stress
    - Waterborne disease
    - Drowning and injuries
  - Indirect effects:
    - Respiratory ailments
    - Disruption to economic and social networks
    - Strain on essential services
    - Wildfires

- **Ecosystem threats**
  - Direct effects:
    - West Nile virus
    - Lyme disease
    - Liver, respiratory, nervous, skin disorders (from harmful algal blooms)
  - Indirect effects:
    - Threats to livelihood
    - Financial strains

MDH
Growing awareness for unique CC impacts on well-being in rural communities
Why are rural communities uniquely impacted?

- Economies tied to natural resources
- Less density of services, programs
- Existing pressures
- Aging population
Focus on vulnerabilities......
But what about strengths?

- Social capital
- Community cohesion
- Quality of life/access to nature
- Promise of new economies (agritourism)
Examples of CC health impacts for rural MN

- Extreme Temperatures
- Flooding & Private Wells
- Lyme disease
- (Pollen)
Extreme Temperatures

- Study: At what temperature (humidity, etc) do we see an increase in death, illness?
Extreme Temperatures

Focus on TCMA due to data access & urban heat island effect

Annual average minimum temperature (°F) for Minnesota, 1900-1959 (left) and 1960-2015 (right).
Extreme Temperatures

However, data suggests rural areas hit harder

Non-metro vs Metro Heat-Related ED visits
Why?

Urban resiliency?
- More cooled spaces in urban area
- Denser social networks
- More services

Rural vulnerability?
- More outdoor workers, recreation
- Less services, cooled spaces, networks

ED visits by Age and Gender

Answers are key to effective adaptation strategies
Flooding & Private Wells

- Increased heavy rainfall, most common cause of flooding
- MN has 1.1 million private well users
- Studies show lack of testing & treatment
- Evidence of contamination
Flooding & Private Wells

More heavy rainfall expected, but not yet sure magnitude, frequency

Study objectives:

- What is historical relationship between heavy rainfall & flooding?
- How will climate change (change in precip profile) alter that relationship?
- What are the implications for Minnesotans dependent on private well water?
Flooding & Private Wells

2010:
Number of counties declared disaster for flooding: 13
Total public assistance: $26M

2012:
# counties declared: 15
Total public assistance: $88M

2013:
# counties declared: 18
Total public assistance: $28M

2014:
# counties declared: 37 (plus 3 tribal communities)
Total public assistance: $81M
Flooding & Private Wells

95th percentile estimates for June precipitation for 2050-2074 (high SD)

95th percentile estimates for June precipitation for 2050-2074 (low SD)
Flooding & Private Wells

What amount of rainfall was associated with flooding in past Junes?

• By review of past events, generally and conservatively above 6”

How does this compare to our future estimates?

• Using both high and low estimates of SD, all counties will be above this value by mid-century

• Majority of counties with the highest density of SFHA wells are projected to have highest precipitation extremes, often associated with flood disasters

95th percentile estimates for June precipitation for 2050-2074 (high SD)

95th percentile estimates for June precipitation for 2050-2074 (low SD)
Reported Cases of Lyme Disease—United States, 2014

One dot is placed randomly within the county of residence for each confirmed case. Though Lyme disease cases have been reported in nearly every state, cases are reported based on the county of residence, not necessarily the county of infection.

In 2014, 96% of confirmed Lyme disease cases were reported from 14 states:

| Connecticut | New Jersey |
| Delaware    | New York   |
| Maine       | Pennsylvania |
| Maryland    | Rhode Island |
| Massachusetts | Vermont     |
| Minnesota   | Virginia   |
| New Hampshire | Wisconsin  |
Reported Lyme Disease Cases in 1996 and 2014

1996

2014

Lyme disease risk in Minnesota is confined to forested areas throughout the state. Take precautions to prevent TBD when visiting these areas.

Reported Cases of Lyme Disease in Minnesota, 1996-2013
(n = 14,367)

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996</td>
<td>252</td>
</tr>
<tr>
<td>1997</td>
<td>256</td>
</tr>
<tr>
<td>1998</td>
<td>261</td>
</tr>
<tr>
<td>1999</td>
<td>283</td>
</tr>
<tr>
<td>2000</td>
<td>465</td>
</tr>
<tr>
<td>2001</td>
<td>463</td>
</tr>
<tr>
<td>2002</td>
<td>473</td>
</tr>
<tr>
<td>2003</td>
<td>866</td>
</tr>
<tr>
<td>2004</td>
<td>1,023</td>
</tr>
<tr>
<td>2005</td>
<td>917</td>
</tr>
<tr>
<td>2006</td>
<td>913</td>
</tr>
<tr>
<td>2007</td>
<td>1,239</td>
</tr>
<tr>
<td>2008</td>
<td>1,090</td>
</tr>
<tr>
<td>2009</td>
<td>1,065</td>
</tr>
<tr>
<td>2010</td>
<td>1,283</td>
</tr>
<tr>
<td>2011</td>
<td>1,203</td>
</tr>
<tr>
<td>2012</td>
<td>912</td>
</tr>
<tr>
<td>2013</td>
<td>1,431</td>
</tr>
</tbody>
</table>
Lyme

Climate changes are having a major impact on ecosystems, leading to significant alterations in insect and wildlife habitat.
Pollen

Change in Ragweed Pollen Season, 1995–2015

Ziska et al., 2014
Randy Cantrell
Rural Sociologist
HTTP://RURALFUTURES.NEBRASKA.EDU/

Ben Winchester
Senior Research Fellow
University of Minnesota Extension

University of Minnesota Morris

A renewable, sustainable education.
WHOSE NARRATIVE?
“The kids are all leaving”
“Outmigration is a problem”
“There is a Brain Drain”
“Rural areas are dying”

Deficit Approach
Dark Times Ahead?

Rural Minnesota is in trouble. Young people are fleeing the farms and forests of the Gopher State, and the residents left there are aging. And they’re dying. While populations decline outstate, the Twin Cities area, especially the suburbs, booms.

Rural Populations Continue to Shrink

Is Rural America Struggling? provides an excellent summary of the economic and population issues facing rural America. Key quote:

... rural America’s job growth is stagnant and the population is in decline. In fact, it’s the first time such a population decline has been recorded in the nation’s rural counties.

People keep leaving rural America. According to U.S. Census figures from 2010, just 16% of the country’s population lives in rural areas, down from 20% in 2000, and down dramatically from 72% about a hundred years ago. Behind those statistics, though, is a whole collection of stories, both of the people who left their rural hometowns — and of those who’ve stayed, that small percentage of Americans who still live in the hollers, backwoods, and ranches of this nation. There are stories, too, of people who’ve returned, drawn back to the small towns they left for myriad reasons. We want to know those reasons, and the story of rural life that they tell.

Sociologists Patrick Carr and Maria Kefalas spent two years in a small town in Iowa trying to find out why so many young people are leaving rural America. What they found was that many small towns are playing a role in their own demise, by pushing the best and brightest to leave and under-investing in those who stay.

We became kind of the poster child for the war on poverty, and any time somebody wanted to do a story about poor people, we were the first stop.
No More Anecdata!

anecdata (noun). information which is presented as if it is based on serious research but is in fact based on what someone thinks is true.
The rural idyll

"It looks like a ghost town," said Bill Gibson, a 74-year-old farmer, whose grandfather broke ground on the family's land with a team of oxen in the middle of the 19th century. "I sure miss the people."

"Agriculture is no longer the mainstay of the rural economy."

University of Minnesota Morris
A renewable, sustainable education.
WHY REWRITE THE NARRATIVE?

2016 RCD State Convening
Rewrite, Not Just Update

- Leads to framing problems by the rural industry, media, and leaders

Rural Populations Continue to Shrink

Is Rural America Struggling? provides an excellent summary of the economic and population issues facing rural America. Key quote:

... rural America’s job growth is stagnant and the population is in decline. In fact, it’s the first time such a population decline has been recorded in the nation’s rural counties.

- Lack of non-agricultural rural media voice
Mixed Messages

"People in the “L” tend to be older per capita than in more populated areas and make less money. More still make their living farming the land or in agriculture-linked activities. Homes and businesses are scattered widely across the landscape and property values are lower, yielding a weaker tax base.”

Rural counties in Minnesota leading economic recovery
WHAT IS RURAL?
Imagery and Geography
Rural “Defined”

US. Census

OMB

Economic Research Service

University of Minnesota Morris

A renewable, sustainable education.
RURAL POPULATION AND MIGRATION
1900-1950

• Mechanization of agriculture
• Roads and transportation
• Educational achievement and population loss

1950-1990

• Main street restructuring
• School consolidations
• Hospitals closings
Rural is Changing, not Dying

• Yes, things are changing

• These changes impact rural and urban areas alike
  – More apparent in rural places

• Research base does NOT support notion that if XXXX closes, the town dies
  – In Minnesota only 3 towns have dissolved in past 50 years
Rural Rebound

- Since 1970, rural population increased by 11%
  - Relative percentage living rural decreased

1970:
- Population: 203,211,926 (53.6m rural)

2010:
- Population: 308,745,538 (59.5m rural)

A renewable, sustainable education.
Rural Data

• Population figures reduced by formerly rural places now designated as urban
  – There is a new urbanity across rural areas (Micropolitan definitions)
  – This impacts other statistics such as home values, incomes

• Population figures reduced by formerly rural places now designated as urban (since 1974)
  – Minnesota 352,224 residents now classified urban
Between 1995 and 1999, 43% of Minnesota residents moved. (counties: low=25%, high 49%)
Cohort Lifecycle

University of Minnesota Morris

A renewable, sustainable education.
If we have 20 children 10-14 in 1990, we expect 20 young adults aged 20-24 in 2000.
Age 20-24

1990-2000

2000-2010

Percent Change
-63.8 - 0.0
0.1 - 10.0
10.1 - 25.0
25.1 - 145.3

Percent Change
-64 - 0
0.1 - 10
10.1 - 25
25.1 - 205.1

University of Minnesota Morris

A renewable, sustainable education.
Age 30-34

1990-2000

2000-2010

University of Minnesota Morris

A renewable, sustainable education.
Newcomers: Why?

University of Minnesota Morris

A renewable, sustainable education.
People Recruitment
Diversified Rural Economy

University of Minnesota Morris

A renewable, sustainable education.
Figure 21
Farm Earnings Less Important in Local Economies Now Than 30 Years Ago

Farming accounted for 20 percent or more of earnings in 877 nonmetro counties in 1969.

By 1999, farming accounted for 20 percent or more of earnings in only 258 nonmetro counties.
1099ers
Self-employed
Non-farm Proprietors – Big Stone County

Nonfarm Proprietor / Total Employment

2001: 22%
2014: 30%

University of Minnesota Morris
A renewable, sustainable education.
## % Working from Home

<table>
<thead>
<tr>
<th>Rank</th>
<th>County</th>
<th>% Workers 16+</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Rice</td>
<td>13</td>
</tr>
<tr>
<td>2</td>
<td>Lincoln</td>
<td>11.8</td>
</tr>
<tr>
<td>3</td>
<td>Lac qui Parle</td>
<td>10.9</td>
</tr>
<tr>
<td>4</td>
<td>Kittson</td>
<td>10.6</td>
</tr>
<tr>
<td>5</td>
<td>Traverse</td>
<td>10</td>
</tr>
<tr>
<td>6</td>
<td>Murray</td>
<td>9.4</td>
</tr>
<tr>
<td>7</td>
<td>Yellow Medicine</td>
<td>9.2</td>
</tr>
<tr>
<td>8</td>
<td>Big Stone</td>
<td>9</td>
</tr>
<tr>
<td>9</td>
<td>Nicollet</td>
<td>9</td>
</tr>
<tr>
<td>10</td>
<td>Norman</td>
<td>9</td>
</tr>
</tbody>
</table>
Dynamics of the Rural Housing Supply

Prepare for one of the largest demographic changes to rural America since 1930
Key Tenet - Housing Demand Not Linked to Population Growth

Fillmore County, MN

<table>
<thead>
<tr>
<th>Year</th>
<th>Population</th>
<th>% Pop Change</th>
<th>Occupied Housing Units</th>
<th>% Change Occupied Housing Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>20,777</td>
<td></td>
<td>7,822</td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td>21,122</td>
<td>2%</td>
<td>8,228</td>
<td>5%</td>
</tr>
<tr>
<td>2010</td>
<td>20,866</td>
<td>-1%</td>
<td>8,545</td>
<td>4%</td>
</tr>
</tbody>
</table>

A renewable, sustainable education.
<table>
<thead>
<tr>
<th></th>
<th>% Age 45-54</th>
<th>% Age 55-64</th>
<th>% Age 65+</th>
<th>Total Boomer+</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (urban)</td>
<td>24.5%</td>
<td>21.3%</td>
<td>24.2%</td>
<td>70.1%</td>
</tr>
<tr>
<td>2</td>
<td>22.8%</td>
<td>21.8%</td>
<td>27.1%</td>
<td>71.8%</td>
</tr>
<tr>
<td>3</td>
<td>22.0%</td>
<td>22.0%</td>
<td>28.5%</td>
<td>72.6%</td>
</tr>
<tr>
<td>4</td>
<td>22.2%</td>
<td>22.5%</td>
<td>29.4%</td>
<td>74.1%</td>
</tr>
<tr>
<td>5</td>
<td>22.1%</td>
<td>22.7%</td>
<td>28.0%</td>
<td>72.8%</td>
</tr>
<tr>
<td>6</td>
<td>21.6%</td>
<td>22.4%</td>
<td>30.7%</td>
<td>74.7%</td>
</tr>
<tr>
<td>7</td>
<td>21.5%</td>
<td>22.6%</td>
<td>30.8%</td>
<td>74.9%</td>
</tr>
<tr>
<td>8</td>
<td>21.4%</td>
<td>23.0%</td>
<td>32.3%</td>
<td>76.7%</td>
</tr>
<tr>
<td>9 (rural)</td>
<td>21.0%</td>
<td>22.9%</td>
<td>33.3%</td>
<td>77.2%</td>
</tr>
<tr>
<td>Total</td>
<td>23.4%</td>
<td>21.7%</td>
<td>26.3%</td>
<td>71.5%</td>
</tr>
</tbody>
</table>
Continuum of Residential Dynamics

Supply

Age 20s 30s 40s 50s 60s 70s

Single-Family Rent

Single-Family Own

Smaller Own

Recreation, Townhouse Own/rent

Assisted Living

Demand Preferences

University of Minnesota Morris

A renewable, sustainable education.
## Life-Cycle “Stretched Out”

<table>
<thead>
<tr>
<th>Previous Generations 65+</th>
<th>Baby Boomer Generation 70+?</th>
</tr>
</thead>
<tbody>
<tr>
<td>– Retire</td>
<td>– Retire</td>
</tr>
<tr>
<td>– Selling home</td>
<td>– Selling home</td>
</tr>
<tr>
<td>– Moving</td>
<td>– Moving</td>
</tr>
<tr>
<td>– Downsizing</td>
<td>– Downsizing</td>
</tr>
</tbody>
</table>

*University of Minnesota Morris*

A renewable, sustainable education.
Baby Boomer Preferences/Trends

• Most Common Preferences
  1. Age in place
  2. Single-story living
  3. Owning
  4. Working or volunteering
## Big Stone County Housing

<table>
<thead>
<tr>
<th></th>
<th>2000</th>
<th>2010</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total housing units</td>
<td>3,171</td>
<td>3,115</td>
<td>-2%</td>
</tr>
<tr>
<td>Occupied housing units</td>
<td>2,377</td>
<td>2,293</td>
<td>-4%</td>
</tr>
<tr>
<td>Owner-Occupied</td>
<td>2,022</td>
<td>1,848</td>
<td>-9%</td>
</tr>
<tr>
<td>Renter-Occupied</td>
<td>355</td>
<td>445</td>
<td>25%</td>
</tr>
<tr>
<td>Vacant housing units</td>
<td>794</td>
<td>822</td>
<td>4%</td>
</tr>
<tr>
<td>For rent</td>
<td>91</td>
<td>83</td>
<td>-9%</td>
</tr>
<tr>
<td>For sale only</td>
<td>114</td>
<td>58</td>
<td>-49%</td>
</tr>
<tr>
<td>Rented or sold, not occupied</td>
<td>44</td>
<td>38</td>
<td>-14%</td>
</tr>
<tr>
<td>For seasonal, recreational, or occasional use</td>
<td>433</td>
<td>452</td>
<td>4%</td>
</tr>
<tr>
<td>Other vacant</td>
<td>112</td>
<td>190</td>
<td>70%</td>
</tr>
</tbody>
</table>
Baby Boomers Shift 2\textsuperscript{nd} Homes to Permanent Homes

Figure 2: Age of respondents (n=561)

Figure 13: Intention of respondents to retire to second home property (n=569)

Pesch and Bussiere. 2014. Profile of Second Homeowners in Central and West Central Minnesota
Symposium Theme

Rural Housing: Moving In, Moving Out, and Moving Forward

June 7 – 9th, 2016
University of Minnesota Morris
LEADERSHIP AND NON-PROFITS

2016 Big Stone County

University of Minnesota Morris

A renewable, sustainable education.
Per-Capita Leadership
Requirements

• Population Over 10,000
  6% run for or accepted appointment to public office
  or lead voluntary organizations

• Population Under 1,000
  27% run for or accepted appointment to public
  office or lead voluntary organizations

(Nebraska Rural Poll, 2004)
Minnesota gained 7.8% in population and 19.4% in the number of nonprofits.

Minnesota: The most rural counties experienced a loss of 4.6% in population, yet the number of nonprofits increased 13.8%.
Changing Types of Involvement - The Social Organization (historical)

- Place-based
- Broadly focused
- Word of mouth
- Agricultural base of interests

Green & Haines. 2007. Asset Building and Community Development
Changing Types of Involvement - The Social Organization (present)

- Cover wide geographic area
- Narrowly focused goals/self-interest
- Diverse social interests
- Technological – social media

The people today are challenged in “connecting” with the existing social infrastructure.

Green & Haines. 2007. *Asset Building and Community Development*
Thank you

The University of Minnesota is an equal opportunity educator and employer. This PowerPoint is available in alternative formats upon request.
Energy Transition
planning, policies, and programs for rural communities

Michelle Gransee, SEO Manager: Clean Energy & Programs
MN Department of Commerce, Energy Division
September 9, 2016
Minnesota Department of Commerce

Division of Energy Resources
State Energy Office

Accelerate market acceptance of energy efficiency & renewables
Research & reports
Technical Assistance & outreach
Policy Implementation
Program Oversight
MN State Energy Office

• Research & Reports
  • Conservation Applied Research & Development Program
  • Legislative Mandates
  • Special Projects
MN State Energy Office

• **Technical Assistance**
  • State and Local Units of Gov’t
    • Guaranteed Energy Savings Program
    • Local Energy Efficiency Program
    • Energy Assurance
MN State Energy Office

• **Technical Assistance**
  • Businesses & Consumers
    • Info Center
    • Clean Energy Technologies
    • MN Business First Stop
    • Solar Supply Chain
    • Info Center & web-based resources
    • Clean Energy Community Award
    • Outreach (Eco Experience, Clean Energy Resource Teams, etc.)
MN State Energy Office

- **Program Oversight**
  - Weatherization Assistance Program
  - Conservation Improvement Program
  - Financial Programs
MN State Energy Office

• **Policy Implementation**
  • Renewable Portfolio Standard/SES
  • Made in Minnesota Solar Program
  • Community Solar Gardens
  • Value of Solar Study
  • Energy Efficiency Resource Standard
  • Greenhouse Gas Emission Reduction Goals
  • EO’s such as GESP
  • Sunshot Initiative
Energy Landscape

THE ENERGY LANDSCAPE IS RAPIDLY CHANGING

- 15% Growth
- 12% Economic Growth
- 0% Change in Energy Use
- 100% Price of Solar
- 50% Price of Solar
- 6% Electricity from Renewables in 2005
- 21% Electricity from Renewables in 2015
Communities Going Green

MOMENTUM TOWARD CLEAN ENERGY IS ALREADY BUILDING

MINNESOTA
RANKED 4th NATIONALLY
ETHANOL PRODUCTION

FROM 1997 to 2012
MINNESOTANS HAVE SAVED OVER 56 TRILLION BTUs OF ELECTRICITY & NATURAL GAS

18 UTILITIES OFFER COMMUNITY SOLAR
Highlights of opportunities

- Community level
- Government
- Individual businesses & consumers
Opportunities for Communities

- MN 2025 Energy Action Plan
- B3 Benchmarking
- Clean Energy Communities Awards
MN 2025 Energy Action Plan

• stakeholder-driver plan
• designed to meet MN energy goals
• strategies in five categories:
  • Energy supply and grid modernization
  • Efficient buildings and integrated energy systems
  • Industrial and agricultural processes
  • Local planning and action
B3 Benchmarking

- Online tool for building design and operation
- Tracking over 7,600 buildings in MN
  - Energy Use (SB2030 Energy Standard)
  - Carbon Emissions
  - Indoor Potable Water
  - Outdoor Potable Water
  - Storm water
  - Construction Waste
  - Indoor Environment (Satisfaction)
- Provides stack-rank of buildings to prioritize
- Offers case studies & project scorecards
Clean Energy Community Awards

• Begun in 2016
• Acknowledges communities for furthering state clean energy goals through policies and programs that encourage energy efficiency and renewable energy
• Winners announced in October
• Expanded in future years
Clean Energy Community Awards

8 Finalists:

• Minneapolis Air National Guard 133 Air Wing
• City of Saint Cloud
• Cities of Pelican Rapids and Fergus Falls
• City of Minneapolis
• City of Morris
• City of Hutchinson
• Leech Lake Band of Ojibwe
• Chisago County’s Clean Energy Hub
LEEP - Local Energy Efficiency Program

• Energy Studies to be used in cost-effective energy-savings projects
• Cities, Counties, K-12 School Districts, Park Districts
• State Assisted Energy Study using Design-Bid-Build for Implementation
• $50k and $350k
• Up to 15 years financing
• Pre-qualified firms, standard documents & contracts, Supplemental Cash Flow Agreement
• Project design & implementation handled by LUG
• St Paul Port Authority provides financing agreements for LEEP participants through Energy Savings Partnership
Opportunities for Individuals

• Conservation Improvement Program
• Weatherization Assistance Program
• Made in Minnesota Solar Energy Incentive Program
Conservation Improvement Program

- Rebates and other incentives
- Energy efficiency improvements
- Residential offerings:
  - energy audits
  - high-efficiency lighting and appliances
  - insulation and air sealing
- Commercial/industrial offerings:
  - high-efficiency (HE) boilers, chillers, and rooftop units
  - HE lighting and lighting control systems
  - HE motors
- Contact local electric or natural gas utility to learn more about the utility CIPs available for your home or business
Weatherization Assistance Program

- Provides efficiency and weatherization improvements
  - air sealing and insulation
  - mechanical systems
  - health and safety
- Income eligible households
- Cost-effective improvements
- $1500-$7000 / household
- Qualification for REEGP
Made in Minnesota Solar Energy Incentive Program

- $15 million per year
- Xcel Energy, MN Power & Otter Tail Power customers
- Production Based Incentive (PBI)
- < 40 kW Commercial, < 10 kW Residential
- 50%/50% residential and commercial projects
- Applications: Jan1-Feb 28

Photo Credit: Applied Energy Innovations
Michelle Gransee
State Energy Office Manager
Clean Energy * Programs
651.539.1886 or 1-800-657-3710
info.energy@state.mn.us

~Thank you~
Resources to Advance Clean Energy

Lissa Pawlisch
Clean Energy Resource Teams (CERTs)
UMN Regional Sustainable Development Partnerships & Extension
CERTs Mission: Connect individuals and their communities to the resources they need to identify and implement community-based clean energy projects
Statewide Partnership & Collaboration

Regional Sustainable Development Partnerships

UNIVERSITY OF MINNESOTA EXTENSION

MINNESOTA DEPARTMENT OF COMMERCE
Division of Energy Resources

GREAT PLAINS INSTITUTE

SRDC
CERT Regional Staff

Kristi Fernholz, UMVRDC
West Central CERT Coordinator
kristi.fernholz@umvrdc.org

Brian Bluhm
Northeast CERT Coordinator
Brian@cleanenergyresourceteams.org

Chris Meyer
Southeast CERT Coordinator
Chris@cleanenergyresourceteams.org
What Does CERTs Do?

LEARN
- Write blog posts & case studies
- Create educational guides
- Manage diverse web-based tools

CONNECT
- Host events, tours, and conferences
- Help with community organizing
- Connect people to technical resources

ACT
- Provide seed grant funding and more
- Deliver research-based campaigns
- Spur other statewide programs
Right Light Guide

Right Light Guide
for General Use Bulbs

Today there are many lighting options available. The right bulb for you depends on how much light you need, what color light you want, and its costs and features.

STEP 1  Decide How Much Light You Need

Focus on Brightness. Different amounts of light are needed for different uses. Instead of thinking about light bulbs based solely on the amount of energy they use, focus on their brightness level.

Lumen is the measurement of brightness. Higher lumen bulbs produce brighter light.

If you like your bulb’s current brightness, choose a CFL or LED with similar lumens to reduce your energy use. You may also consider a bulb that is less bright to save more.

Note: Lumen output listed on packages may vary. Light bulb labeling anywhere from 900 to 1600 lumens is acceptable for 60-watt incandescent replacement. If in doubt, use a lumen calculator.

<table>
<thead>
<tr>
<th>Brightness</th>
<th>Incandescent</th>
<th>CFL</th>
<th>LED</th>
</tr>
</thead>
<tbody>
<tr>
<td>450 lumens</td>
<td>43W</td>
<td>9-13W</td>
<td>4-8W</td>
</tr>
<tr>
<td>890 lumens</td>
<td>80W</td>
<td>16-18W</td>
<td>6-10W</td>
</tr>
<tr>
<td>1200 lumens</td>
<td>75W</td>
<td>22-24W</td>
<td>15-18W</td>
</tr>
<tr>
<td>1600 lumens</td>
<td>130W</td>
<td>29-30W</td>
<td>16-20W</td>
</tr>
</tbody>
</table>

STEP 2  Decide What Color Light You Want

Choose Light Appearance.

You'll be pleased with your new bulb by choosing a light appearance that you like. All of these colors are available for LEDs and CFLs and at most brightness levels.

Choose one of the following:

- Soft White, Warm White, Natural White, Bright White, Cool White
- Red, Blue, Green, Pink
- Dimmable, Daylight, 2700K, 3000K, 4100K, 6500K

Different Colors, Same Brightness

- Soft White, Warm White: Living Areas, Bedrooms
- Bright White, Cool White: Work Areas, Bathrooms
- Natural White: Dining Areas, Workshops, Garages

Energy Facts

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>22 bulbs</td>
<td>22.0 years</td>
<td>9.5 watts</td>
</tr>
</tbody>
</table>

Pros (+) and Cons (-)

- Less heat: LED is cooler than incandescent.
- Lasts 25-30 times longer than incandescent.
- Non-replacement models require replacement every few years. LED replacement models are longer lasting.
- More expensive than incandescent, but use less energy.
- Not all fixtures are compatible with LED bulbs.
- Some LED bulbs may not work in dimming or recessed fixtures.

Resources

To learn about lighting rebates and incentives, visit lighting.mncerts.org.

mncerts.org/lighting
CERTified Campaigns

Efficient Spray Vales and Aerators: Make a Splash

LED Lighting for Turkey Barns:

LED Lighting for Gas Station Canopies:

Light Recycling:

RECYCLE YOUR HOLIDAYS

GOBBLING UP SAVINGS

LIGHT UP YOUR STATION & SAVE
Small Business Blitzes
Solar Suitability App

mn.gov/solarapp
Clean Energy Project Builder

Finding Solar Gardens:
- Electric Utility
- Availability
- Eligible Counties

Map with locations in Minnesota and South Dakota.
Tools for Farms and Businesses

Renewable Energy for Greater Minnesota: Solar, wind, and biomass are plentiful sources of clean energy in Minnesota, and we're here to help farmers and rural small businesses get projects done. CERTs offers tools to pursuing renewable energy projects.

http://www.cleanenergyresourceteams.org/project-planning/farmers
Community Solar Gardens

1. Solar PV panels are installed in sunny locations to produce renewable electricity.

2. Individual entities can subscribe to enough solar to cover up to 120% of their annual electricity usage.

3. Each subscriber’s utility bill is credited with the electricity created by their share of the solar garden.

SolarGardens.MnCERTs.org
Tools for Governments

http://www.cleanenergyresourceteams.org/gesp

http://www.cleanenergyresourceteams.org/pace

http://www.cleanenergyresourceteams.org/greenstep
Property Assessed Clean Energy

http://www.cleanenergyresourceteams.org/pace
Seed Grants

http://www.cleanenergyresourceteams.org/projects
CERTs: Minnesotans Building a Clean Energy Future

Lissa Pawlisch
CERTs Director
612-624-2293
pawl0048@umn.edu
Infrastructure Needs: MnDOT Perspective

Philip Schaffner
Office of Transportation System Management
September 9, 2016
# Climate Impacts to MN Transportation

<table>
<thead>
<tr>
<th>Climate Change Impact</th>
<th>Confidence In Change for MN in next 20 years</th>
<th>Effect to Transportation System</th>
</tr>
</thead>
</table>
| Heavy Precipitation/Flooding | Very High | • Damage to highway and rail infrastructure, airport runways  
• Overtopping roads will slow operations and performance  
• Slope failures and erosion |
| Warmer Winters | Very High | • More ice  
• Reduced pavement conditions and life cycles  
• Downed power lines with ice storms |
| New species ranges | High | • Changes in roadside vegetation mixes  
• Soil erosion  
• Increase in invasive species populations  
• Increased exposure of construction and maintenance crews to vector-borne diseases |
| Drought | Medium | • Reduced river navigability for barges  
• Roadside vegetation stress, which may reduce rainwater storage and increase soil erosion in the long-term |
| High Heat | Low | • Pavement and rail buckling  
• Vehicles overheating  
• Electrical system malfunctions  
• Limitations on construction hours |
| Wildfires | Unknown | • Road closures  
• Immediate and significant threat to human safety  
• Damage to roadside infrastructure |
MnDOT Flash Flood Vulnerability and Climate Adaptation Pilot Project—2014

- **Phase 1: System-wide vulnerability assessment**
  - High-level screen of trunk highway network in MnDOT Districts 1 & 6

- **Phase 2: Facility-level adaptation analysis**
  - Two high risk facilities (one culvert in each district)
Systemwide Vulnerability Assessment Approach

Identify Assets of Interest
- Bridges
- Large culverts
- Pipes
- Roads paralleling floodplains

Calculate the Vulnerability Scores for Each Asset

**Sensitivity**
- Capacity to handle higher flows
  - % change in peak design flow required for overtopping (based on StreamStats)
- Asset condition
  - Pavement condition (roads)
  - Scour rating (bridges)
  - Substructure condition (bridges)
  - Channel condition (bridges and large culverts)
  - Culvert condition (large culverts)
  - Pipe condition (pipes)

**Exposure**
- Stream velocity
- Previous flooding issues
- Belt width to span length ratio (bridges, large culverts, pipes)
- Belt width to floodplain width ratio (roads)
- % of total roadway length parallel to the floodplain at risk of erosion from the stream channel (roads)
- % forest land cover in drainage area (bridges, large culverts, pipes)
- % of drainage area not covered by lakes & wetlands (storage capacity)
- % urban land cover in drainage area

**Adaptive Capacity**
- Average annual daily traffic (AADT)
- Heavy commercial average daily traffic (HCADT)
- Detour length
- Flow control regime (bridges, large culverts, and pipes)

Rank Flood Vulnerabilities by District
Highly vulnerable (Tier 1 and 2) assets are not necessarily in imminent danger of flooding, nor are lower vulnerability assets immune from flooding. Values are indicators of relative vulnerability compared with other assets in the same district.
Highly vulnerable (Tier 1 and 2) assets are not necessarily in imminent danger of flooding, nor are lower vulnerability assets immune from flooding. Values are indicators of relative vulnerability compared with other assets in the same district.
Other Related MnDOT Programs

- Chapter 152–funded Flood Mitigation Program
- Bridge scour monitoring
- Funding updated hydrology and climate data
- Living snow fence and standing corn row programs
- Native seed mixes and pollinator corridors
Context for MnDOT Efforts
Aging Infrastructure

Age of pavement on MN State Highway System (2014)
~12,000 Centerline Miles (Interstates, US & MN Highways)

NHS = National Highway System
## Current & Future Condition

<table>
<thead>
<tr>
<th>Pavement Condition</th>
<th>System</th>
<th>2015</th>
<th>2037*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interstate</td>
<td>1.9% poor</td>
<td>4% poor</td>
<td></td>
</tr>
<tr>
<td>Remaining NHS</td>
<td>3% poor</td>
<td>8% poor</td>
<td></td>
</tr>
<tr>
<td>Non-NHS</td>
<td>4% poor</td>
<td>18% poor</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bridge Condition</th>
<th>NHS</th>
<th>4.5% poor</th>
<th>5% poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-NHS</td>
<td>1.3% poor</td>
<td>7-8% poor</td>
<td></td>
</tr>
</tbody>
</table>

| Culverts           | All          | 13% poor   | 14-15% poor|

*Based on draft 2018–2037 20-Year Minnesota State Highway Investment Plan*
Ownership of Minnesota Roads (measured by centerline)

- Township: 41%
- County: 31%
- City: 16%
- Other: 4%
- State: 8%

MnDOT
Recommended Strategies for Transportation Agencies

- Proactively identify risks to the system & surrounding communities in order to prioritize mitigation and response activities
  - 2017 Slope Vulnerability Assessment
- Support regional approaches to mitigating identified risks to the transportation system and surrounding communities
- Use recovery efforts to reduce system vulnerabilities
www.dot.state.mn.us/climate
A challenge, assistance & recognition program for taking more sustainable actions

www.MnGreenStep.org
2007: “Green” Star City concept emerges @ CERTs, GPI, Hunt Utilities Group

2008: Legislature asks for a report

2009: Advisory & technical committees convened

2010: Program launch @ League of MN cities conference

2015: City performance metrics

Minnesota GreenStep Cities
A report to the Minnesota legislature regarding Green Star award expansion and a program proposal to assist local governments in taking the next step to implement carbon reductions and other environmental actions.
Main Partners:

- League of Minnesota Cities
- Minnesota Pollution Control Agency
- Great Plains Institute
- Clean Energy Resource Teams (CERTs)
- Minnesota Department of Commerce
- Izaak Walton League – MN Division
- Urban Land Institute – MN, & Regional Council of Mayors
- Preservation Alliance of Minnesota

www.MnGreenStep.org
• **In order to flourish as a society,**
  what’s good for our economy, and what’s good for our environment
  **must become** one-in-the-same.

• **This is the common sense of sustainable development.**

  -- Governor Carlson (1992)
Best Practices

**Buildings and Lighting**
- Public Buildings
- Private Buildings
- New Buildings
- Lighting & Signals
- Building Redevelopment

**Land Use**
- Comp Plans
- City Growth
- Mixed Uses
- Auto-oriented Development
- Design for Natural Resource Conservation

**Transportation**
- Living Streets
- Mobility Options
- City Fleets
- Demand-Side Travel Planning
Best Practices (con’t)

• Sustainable Purchasing
• Urban Forests
• Stormwater
• Parks & Trails
• Water & Wastewater Facilities
• Septics
• Solid Waste Reduction
• Local Air Quality

• Benchmarks & Community Engagement
• Green Business Development
• Renewable Energy
• Local Food
• Business Synergies
• Climate Adaptation & Community Resilience
GreenStep Has Broad Uptake

- 108 cities; 2 Tribal Nations
- 41% of MN’s population
- Big & small
- Liberal and conservative
- Urban and rural
- 2,649 best practice action reports, under 170 actions
City Participation

- 508 TOTAL
- 205 TOTAL
- 107 TOTAL
- 35 TOTAL

Population of Cities:
- under 1000
- 1000-5000
- 5000-25000
- > 25,000

Percent Participating in GSC:
- GreenStep Cities
- Non-GreenStep Cities
The Thinking Behind GreenStep Cities

- **Mayors, city councils, key city staff, and key citizen leaders** (in city commissions, civic groups) essential to action

- **Actions** favored over extensive planning
  - policies; spending $/staff time; info/ed
  - big and small actions by all size cities

- **Peer-learning** lowers the barriers to taking action

- **The economics** stressed in best practice summaries and benefits

- **Businesses** are an essential part of community

- **Measure what matters**: city performance metrics
Pine River Green Steps

1. Efficient Existing Public Buildings
   Track and reduce energy use of city buildings

2. Comprehensive
   Benchmarks & Community Engagement

3. Efficient Highways
   Orientation Development
   Adopt design standards for the Hwy 371 corridor

4. Purchasing
   Adopt a policy that the city will purchase environmentally preferable products and services

5. Urban Forests
   Protect and improve the city's tree canopy

6. Green Business Development
   Launch a "buy local" campaign; support green business practices

7. Local Food
   Establish a farmers' market and a community garden

8. Renewable Energy
   Install public and private sector renewable energy systems

9. Efficient Building and Street Lighting & Signals
   Make traffic signals and street lights more energy-efficient

10. Surface Water Quality
    Protect and improve water quality in Norway Lake

11. Efficient Highway-Oriented Development
    Adopt design standards for the Hwy 371 corridor

12. Mobility Options
    Promote local transit options on a city website

Pine River can become one of Minnesota's first GreenStep Cities by taking twelve low- or no-cost steps.

- Steps 1 through 6 are required for Pine River and all other cities seeking GreenStep designation.
- Steps 7 through 12 were chosen by community members from a list of possibilities.

Shading in a footprint indicates current progress toward completing that step.
Local Food

Strengthen local food and fiber production and access.

Best Practice Actions

1. Incorporate working landscapes - agriculture and forestry - into the ordinance for one or more of the following:
   a. An agriculture and forest protection district.
   b. A local food production district.
   c. Performance standards for minor and major agricultural retail.

2. Facilitate creation of home/community gardens, chicken & bee keeping, and incorporation of food growing areas/access in multifamily residential developments.

3. Create, assist with and promote local food production/distribution within the city:
   a. A farmer’s market or co-op buying club.
   b. An urban agriculture business or a community-supported agriculture (CSA) arrangement between farmers and community members/employees.
   c. A community or school garden, orchard or forest.

4. Measurably increase institutional buying, and sales through:
   a. Purchasing of local/organic/humane/equitable foods by school and event centers.
   b. Sales of local/organic/humane/equitable food in markets, urban convenience stores, hotels and restaurants.

Optional for Category A, B and C Cities

All Category A, B and C cities that choose to implement this best practice are recognized upon completion of at least one action.

SUMMARY

The goals of this best practice are to:

- Protect local food producers and consumers;
- Increase the number of produced and sold local food businesses.

Depending on the specific action(s) taken, benefits of implementing this best practice include increased food security, more healthful food and improved human health, enhanced soil and water quality, reductions in energy use and CO2 emissions, improved wildlife habitat, enhanced community livability and vitality, creation of green jobs, and stronger local economies. For farmers markets alone, of each $100 spent, $62 stays in the local economy and $99 stays in Minnesota’s economy.

Best Practice goal

4 optional actions

Completion/recognition guidance

The argument for taking action

Documented benefits from taking action

First call for help, ideas, perspective, funding
Philipp & Abby, GS coordinators

City performance metrics

Living Streets
Create a network of green complete streets that improves city quality of life and adds value to surrounding properties.

Best Practice Action 6
Implement traffic calming measures, shared space and depaving, in at least one transportation development project.

1,2,3-star completion guidance

BP action reports from cities include who to contact for more information & private sector partners.

- See St. Paul's Traffic Calming Toolbox, Traffic Calming 101 from the Project for Public Spaces, the Institute of Transportation Engineer's traffic calming database, and the MN Dept. of Transportation's resources on roundabouts.

- The Federal Highway Authority strongly encourages the use of road diets (driving lane reconfiguration) where appropriate. The classic road diet involves converting an undivided 4-lane roadway with average daily traffic of 20,000 vehicles or fewer into 3 lanes made up of 2 through lanes and a
How GS thinks about infrastructure

GREY
- road rights of way & telecommunications
- energy
- drinking-/waste-water facilities; city property

GREEN
- water bodies & stormwater
- ecologically productive lands: urban forests; working lands

HUMAN
- civic groups; government; businesses; individual capacities

www.MnGreenStep.org
Infrastructure tools

- Auditor’s Infrastructure Stress Transparency Tool
- Complete streets/living streets design guides
- B3 public building energy/water use database
- MIDS for stormwater (Minimal Impact Design Standards)
- LEED-Neighborhood Development
- Equitable Development Scorecard
- Strong Towns Strength Test; Big-Box Scorecard
- MN Design Team; Main Street MN; Conservation Design Scorecard
Infrastructure tools (con’t)

- Buy-local campaign tools
- Community solar gardens; PACE for businesses
- USDA’s Rural Cooperative Development Grant program; Rural Grocery Store Sustainability Initiative; Food Co-op Initiative Program
- City Resilience Framework; RELi Resiliency Action List
BWSR Climate Adaptation –
Working in partnerships to protect water and soil resources
Mission: to improve and protect Minnesota’s water and soil resources by working in partnership with local organizations and private landowners.
BWSR Climate Adaptation –
Working in partnerships to protect water and soil resources

Trends

Extreme rain events

Damaged conservation plantings

Stressed aquatic systems

Changing forests

Invasive species
BWSR Climate Adaptation –
Working in partnerships to protect water and soil resources

Local Water Management Planning
BWSR Climate Adaptation – Working in partnerships to protect water and soil resources

Local Water Management Planning

- Addressing large storm events
- Using updated design standards
Wetland Protection and Restoration

- Restoring resilient landscapes
- Over 250,000 acres restored and protected
- Approx. 20 million metric tons of carbon dioxide sequestered over 26 years
BWSR Climate Adaptation –
Working in partnerships to protect water and soil resources

Making Landscape Connections
BWSR Climate Adaptation –
Working in partnerships to protect water and soil resources

Agricultural Conservation Practices

Combining practices to slow water flow and improve water quality
BWSR Climate Adaptation –
Working in partnerships to protect water and soil resources

Restoring and Maintaining Diversity and Landscape Resiliency
BWSR Climate Adaptation –
Working in partnerships to protect water and soil resources

Landscape Resiliency Toolbox
Strategies and Tools to Increase Resiliency to Climate Change and other Stressors

1) Planning: Strategic Site Protection/Selection - Work with project partners to identify sensitive, isolated, and unique landscapes that are critical to maintaining natural cycles and plant and animal populations.

2) Design: Minimizing Landscape Stressors - Investigate opportunities to improve environmental conditions throughout projects. Site projects in locations where natural ecosystems such as wetlands, wet meadows, and riparian areas are well preserved or managed.

3) Management: Establishing Connections across Landscapes - Create habitat and genetic dispersal corridors and decrease landscape fragmentation. Establishing connections in agricultural areas will also increase the movement of plants and animals.

4) Planning: Maximizing Biological Function - To achieve the objectives of planning and site selection, the landscape should be designed in such a way that it maximizes the environmental benefits. The design should be flexible enough to accommodate future changes in the landscape.

5) Design: Matching Plant Communities to the Site - Match targeted vegetation to the native plant community that best fits the site. Also, restore natural hydrology regimes to aquatic and wetland systems. Native plant communities should be restored on sites that have been disturbed by human activities or natural events.

6) Management: Restoring and Maintaining Diversity - Restore native plant species that can benefit from the landscape and provide native plants that will be favored by other species.

7) Design: Providing Habitat for Pollinators and other Beneficial Organisms - Pollinators and other insects and animals play an essential role in supporting ecosystems. Pollinators provide seeds and plants that are relied on by a wide range of wildlife by pollinating around 70% of flowering plant species, improve soil health, and provide ecosystem services.

8) Management: Reducing Impacts - Implement a variety of practices such as prescribed burns, conservation tillage, conservation drainages, cover crops, buffer strips, riparian zones, and wetland restoration to manage water resources. Incorporate these practices in urban and rural landscapes to reduce runoff, recharge groundwater, maintain agricultural productivity, improve water quality, and reduce flooding. Promote the wise use of water resources and the use of sustainable systems to help secure adequate supplies in the future.

9) Design: Preserving and Restoring Soil Health - Use cover crops and riparian vegetation in degraded soils to promote good soil structure, organic content, and microorganism populations. Implementing soil health practices that promote productive and sustainable agricultural landscapes.

10) Management: Working with Biological Adaptation - Natural plant communities have the ability to adapt and develop a natural dynamic through genetic adaptation, succession, and natural selection. Promote these processes to provide desired ecological functions and buffer the community during future changes in climate and associated disturbances.

11) Planning: Promoting Natural Resilience - Restore natural disturbances that sustain specific natural plant communities such as prescribed fire, conservation grazing, and hydrologic variation. These disturbances help maintain plant community integrity in plant communities.

12) Design: Managing Invasive Species - Appropriate boundaries - Invasive species are effective in establishing control systems. Plan to work on land where invasive species are present to restore resilient landscapes.

13) Management: Practicing Adaptive Management - Adjust management practices based on monitoring efforts and experiences with success and failures to improve the long-term effectiveness of management practices and resilience of plant communities. Practices such as prescribed burning, water management, and restored grazing and harvesting may help maintain natural disturbances and promote diversity and resilience.

14) Planning: Learning from Field Observations - Information about project success and innovative practices is valuable. What practices provide the best benefits in our landscape? What common activities are not worth the cost or time? Make a list and prioritize these actions.

For more information, contact dan.shay@mn.dhs.us
BWSR Climate Adaptation –
Working in partnerships to protect water and soil resources

Incorporating Pollinator Habitat into all BWSR Programs
“BWSR Pollinator Initiative”
BWSR Climate Adaptation –
Working in partnerships to protect water and soil resources

Managing Invasive Species Across Boundaries

“CWMA Program”
BWSR Climate Adaptation – Working in partnerships to protect water and soil resources

Practicing Adaptive Management – taking a long term view of management
BWSR Climate Adaptation –
Working in partnerships to protect water and soil resources

**Disaster Response**

$53 million for flood Relief since 2000 for southeast, Northeast and northwest MN
BWSR Climate Adaptation –
Working in partnerships to protect water and soil resources

-Climate Change Trends and Action Report
BWSR Climate Adaptation –
Working in partnerships to protect water and soil resources

Thank You!
Minnesota Agricultural Water Quality Certification Program

Certifying that Minnesota’s farms and waters can prosper together

Brad Jordahl Redlin
Certification Program Manager
MAWQCP Background

- Program offers producers:
  - Recognition
  - Financial/Technical assistance
  - Regulatory certainty
  - Branding/Marketing opportunity
  - Check-up/Validation

- Whole-farm planning for water quality; risk assessment of every parcel, every crop

- Pairs producer with conservation professional to develop site-specific solutions to reduce risk to water quality
MAWQCP Background

- Program initiated by MOU signed by Governor Dayton, USDA Secretary Vilsack and EPA Administrator Lisa Jackson
- Placed in statute by MN legislature
- Shaped by an advisory committee comprised of diverse agriculture and conservation representatives
- Provides ‘certainty’…

Certified farms are deemed to be in compliance with any new State water quality rules or laws and considered to be meeting their contributions to any targeted reductions of pollutants during the period of their certification.

MOU signed by Governor Mark Dayton, USDA Secretary Tom Vilsack, and former EPA Administrator Lisa Jackson in 2012.
Assessment Process

- Application establishes **eligibility** for program resources
- Ensures **compliance** with existing water quality regulations
Unitless risk-assessment index for each parcel and crop, scoring between 0 - 10 based on site-specific criteria with site inspection for eligible scores > 8.5

assessment tool online at:  
https://mnwatercertify.mda.state.mn.us/wqcpapp/
Assessment Process

- **Whole farm** conservation planning
- **Site-specific** treatments supported by NRCS field office technical guide
- **Boots-on-the-ground** conservation delivery

- 10 year term of certification, amendments & re-certification as desired.
Partners
1. BWSR: MAWQCP certification is ‘approved alternative practice’ for buffer law

2. PCA key strategy Nutrient Reduction Strategy; Feedlot permits & environmental review priority

3. DNR ag land leases meet MAWQCP standard, results in whole farm certifications.
Private Industry

Providing 12-packs to certified farms, reportedly because good beer needs good water

Precedent setting partnership agreement with Land O’ Lakes, Inc.

MAWQCP certified production offset for all feed for Just BARE brand products

Private consultant participation
Certification & Recognition
STATUS as of Sept. 6, 2016

247 certified farms totaling 140,000+ certified acres implementing 446 New Best Management Practices that have yielded:

- 12.41 million pounds of soil saved per year,
- 8.57 million pounds sediment reduced per year,
- 5,262 pounds of phosphorus prevented from entering our waters per year,
- and reduced nitrogen loss by up to an estimated 49 percent.

And processing 448 current applications
Vilsack to Iowa leaders: ‘Think Big’ on water quality

May 25, 2016

"I can't tell you how irritating it is for me in my office to showcase a Minnesota placard on their water quality initiative," Vilsack said.